



Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

August 16, 2010

L-2010-176  
10 CFR 50.73

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Re: St. Lucie Unit 1  
Docket No. 50-335  
Reportable Event: 2010-006  
Date of Event: June 16, 2010

Unit 1 Manual Reactor Trip Due To Two Dropped Control Rods

The attached Licensee Event Report 2010-006 is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Respectfully,

Richard L. Anderson  
Site Vice President  
St. Lucie Plant

RLA/dlc

Attachment

IE22  
NPR

<b>NRC FORM 366</b> (9-2007)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 08/31/2010					
<b>LICENSEE EVENT REPORT (LER)</b>				Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.							
<b>1. FACILITY NAME</b> St. Lucie Unit 1				<b>2. DOCKET NUMBER</b> 05000335		<b>3. PAGE</b> 1 OF 4					
<b>4. TITLE</b> Unit 1 Manual Reactor Trip Due To Two Dropped Control Rods											
<b>5. EVENT DATE</b>			<b>6. LER NUMBER</b>		<b>7. REPORT DATE</b>		<b>8. OTHER FACILITIES INVOLVED</b>				
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
06	16	2010	2010	- 006	- 00	08	16	2010	FACILITY NAME	DOCKET NUMBER	
<b>9. OPERATING MODE</b>  1			<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)</b>								
<b>10. POWER LEVEL</b>  45%			<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(vii)								
			<input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(A)								
			<input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(viii)(B)								
			<input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(ix)(A)								
			<input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(x)								
			<input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 73.71(a)(4)								
			<input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 73.71(a)(5)								
			<input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> OTHER								
			<input type="checkbox"/> 20.2203(a)(2)(vi) <input type="checkbox"/> 50.73(a)(2)(i)(B) <input type="checkbox"/> 50.73(a)(2)(v)(D)								
			Specify in Abstract below or in NRC Form 366A								
<b>12. LICENSEE CONTACT FOR THIS LER</b>											
NAME Donald L. Cecchetti - Licensing Engineer								TELEPHONE NUMBER (Include Area Code) 772-467-7155			
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>											
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX		
X	AA	ZC	N/A	NO							
<b>14. SUPPLEMENTAL REPORT EXPECTED</b>						<b>15. EXPECTED SUBMISSION DATE</b>		MONTH	DAY	YEAR	
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)						<input checked="" type="checkbox"/> NO					
<b>ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</b>											
<p>On June 16, 2010, St. Lucie Unit 1 was in Mode 1 returning from a scheduled refueling outage when a manual reactor trip was initiated. Due to the control element drive mechanism (CEDM) system not being able to effectively maintain two control element assemblies (CEAs) in the withdrawn and aligned position. This event required Operations to manually trip Unit 1 due to greater than one CEA being misaligned from other CEAs greater than twenty inches. All control systems responded as required.</p> <p>A root cause evaluation (RCE) determined the cause to be a failure of the snubber network capacitors to perform its designed function. Contributing causes included ineffective maintenance on the cable spreading room air conditioners and a weakness in purchasing the correct capacitors for the power switches.</p> <p>Corrective actions included replacement of the under rated network capacitors on the upper gripper power switches which are normally energized (holding) on all CEDMs and the lower gripper, lift, and load transfer power switches for the lead group CEDM's, and reduction of the temperature and humidity within the cable spreading room.</p>											

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**NARRATIVE****Description of the Event**

On June 16, 2010, St. Lucie Unit 1 during St. Lucie Unit 1 power ascension from refueling outage SL1-23, CEA's 38 & 65 [EIIS: ET] dropped into the core from the fully withdrawn position. Troubleshooting revealed that the power switch assembly for CEA's 38 and 65 was the cause of the fault and was removed from the system for inspection.

**Cause of the Event**

A troubleshooting effort was commenced with the assistance of an outside vendor to inspect the power switches for the cause of the fault. The power switch inspection revealed that the snubber network C9 and R24 for the "B" phase and C10 and R25 for the "C" phase had failed. During system troubleshooting CEA's 25, 19, 20 and 41 failed with similar snubber network faults. The investigation concluded the cause of the faults found in the power switches was due to capacitor failure.

In 2003 the failed capacitors in the upper gripper power switches were changed from a paper poly sealed capacitor to a poly film un-sealed capacitor; the effects of the change were not fully evaluated at the time. A previous loss of the HVA-5 and HVA-4 air conditioners caused an increase of temperature and humidity resulting in absorption of moisture into the unsealed poly film center of the capacitors.

The build up of humidity caused a "corona effect" within the capacitors resulting in a breakdown of the capacitor layer by layer until a short occurred. While all power switches are affected with an increase in humidity/moisture, the upper gripper power switches are holding the gripper at power.

The root cause evaluation determined that the intermittent failure of CEDM's 38 & 65 [EIIS: AA] was a failure of the snubber network capacitors. The contributing factors included the CEDM system not maintaining CEDM's 38 & 65 in the withdrawn position due to ineffective maintenance on the cable spreading room air conditioners and a weakness in purchasing the correct capacitors for the power switches.

**Analysis of the Event**

This event is reportable under 10 CFR 50.73(a)(2)(iv)(A), as any event or condition that resulted in a manual or automatic reactor trip.

**Analysis of Safety Significance**

The CEA drop event is a negative reactivity insertion Condition II event already analyzed in the Unit 1 UFSAR in Section 15.4.3, which is assumed to be initiated by a single electrical or mechanical failure that causes any symmetrical configuration of CEAs to drop to the bottom of the core. Condition II occurrences are faults that may occur with moderate frequency during the life of the plant. They are accommodated with, at most, a reactor shutdown with the plant being capable of returning to operation after a corrective action. In addition, no Condition II occurrences cause consequential loss of function of fuel cladding and reactor coolant system barriers.

The resulting negative reactivity insertion in a single or sub-group CEA drop event causes nuclear power to rapidly decrease. An increase in the hot channel factor may occur due to the skewed power distribution representative of a CEA drop

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configuration. Since this is a Condition II event, the UFSAR analysis demonstrates that the Departure from Nucleate Boiling design basis is met for the combination of power, hot channel factor, and other system conditions which exist following a CEA drop event. A spectrum of dropped CEA rod worth bounding the current Unit 1 reactor core was analyzed.

The UFSAR Chapter 15 CEA drop event accident includes a full-length single CEA drop and full-length CEA subgroup drops.

These analyses bound the events that took place on June 16, 2010 when CEAs 38 & 65 fully inserted into the core. Operations confirmed the rod drop indications and manually tripped the reactor in accordance with existing plant procedures. No anomalies were observed after these CEA drop events took place, and Unit 1 operated in a normal and expected manner. Therefore, the conditions described above did not present a nuclear safety concern for St. Lucie Unit 1, and these events had no impact on the health and safety of the public.

Although not expected, operational guidance is provided for off-normal operating procedures using Unit 1 Technical Specification T.S. 3.1.3.1 as a basis, should one or more CEA drop, slip, or become misaligned,.

**Corrective Actions**

The corrective and supporting actions are entered into the Site Correction Action Program (CAP). Any changes to the proposed actions will be managed under CAP.

Completed Corrective actions:

1. Replaced all non-design equivalent network capacitors on the upper gripper power switches which are normally energized.
2. Recorded location of power switches that have inadequate capacitors currently installed.
3. Repaired cable spreading room air conditioner to support correct temperature and humidity controls.
4. Installed temperature and humidity recorder at the control power programmer.
5. Added Operator rounds to record temperature and humidity recorder at the control power programmer.

Corrective actions:

1. Evaluate and procure materials to be used on control element drive motor (CEDMCS) power switches which meet the original design.
2. Incorporate parts list in the repair procedure.
3. Remove all non-design equivalent capacitors from the equipment repair facility.

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**Similar Events**

An Industry database was searched for events involving rod drops related to the maintenance bus or neutral bus. Although several similar events were reviewed, no industry operating experience was found to provide significant information pertaining to these events.

**Failed Components**

CEA Power Switch Snubber Network Capacitors